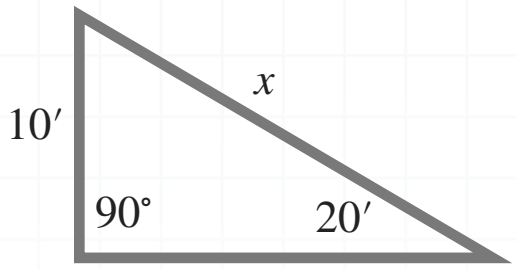
Topic: Pythagorean theorem

Question: Find the length of the hypotenuse.



Answer choices:

A $5\sqrt{5}$

B $10\sqrt{5}$

C $2\sqrt{10}$

D $4\sqrt{5}$

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Solution: B

Since this is a right triangle and we already know the length of two of the sides, we can use the Pythagorean theorem to find the length of the third side. The Pythagorean theorem is

$$a^2 + b^2 = c^2$$

where a and b are the length of the sides bordering the $90°$ angle, and c is the length of the hypotenuse.

Plugging in the dimensions of the triangle we've been given, we get

$$(10)^2 + (20)^2 = c^2$$

$$100 + 400 = c^2$$

$$500 = c^2$$

$$\sqrt{500} = c$$

$$\sqrt{100 \cdot 5} = c$$

$$\sqrt{100}\sqrt{5} = c$$

$$10\sqrt{5} = c$$

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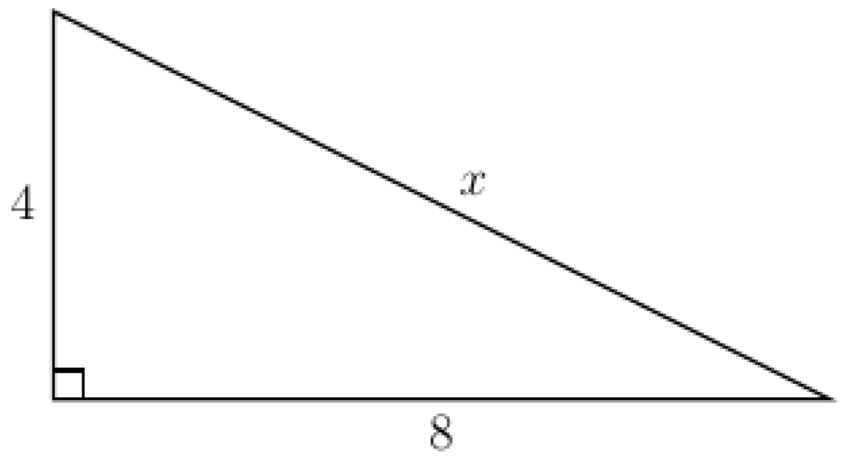
Topic: Pythagorean theorem

Question: Find the length of the unknown side.



Answer choices:

A 5

B $5\sqrt{4}$

C 6

D $4\sqrt{5}$

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Solution: D

The Pythagorean theorem is

$$a^2 + b^2 = c^2$$

Plug the lengths of the two legs in for a and b.

$$4^2 + 8^2 = x^2$$

$$16 + 64 = x^2$$

Rearranging gives

$$x^2 = 80$$

$$x = \sqrt{80} = \sqrt{16} \cdot \sqrt{5}$$

$$x = 4\sqrt{5}$$

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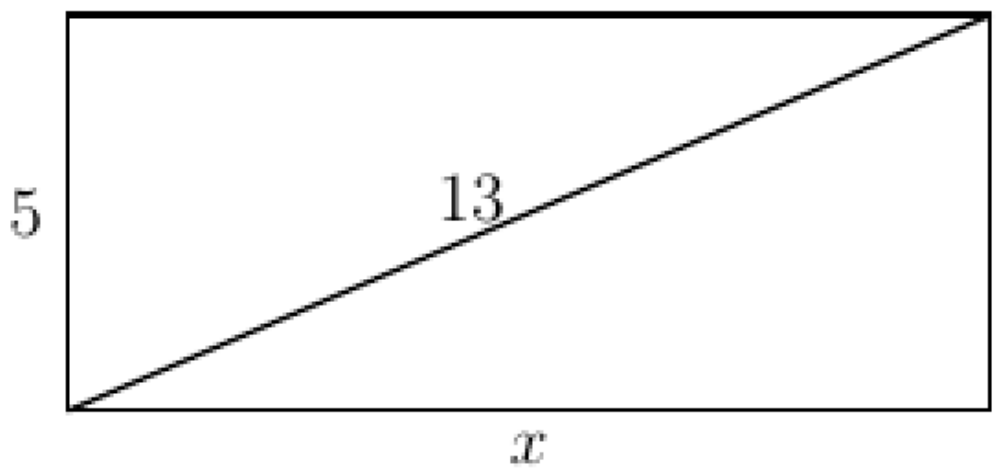

Answer choices:

A $2\sqrt{5}$

B $5\sqrt{5}$

C 6

D 12

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Solution: D

The rectangle side opposite the 5 must also be 5.

The Pythagorean theorem is

$$a^2 + b^2 = c^2$$

If we plug all three side lengths, including x, into the formula, we get

$$5^2 + x^2 = 13^2$$

$$25 + x^2 = 169$$

Rearranging gives

$$x^2 = 169 - 25$$

$$x^2 = 144$$

$$x = \sqrt{144} = 12$$

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